

LE 'HOME' ENTERED AT 13:16:41 ON 04 JUN 2003)

FILE 'CAPLUS' ENTERED AT 13:17:47 ON 04 JUN 2003

L1 0 S PHOTONC (2A) CRYSTAL?
L2 2939 S PHOTONIC (2A) CRYSTAL?
L3 563 S L2 AND (3D OR (THREE (1W) DIMENSION?))
L4 12 S L3 AND VOID
SET SMA OFF
SEL RAN.CAPLUS(10) L4 8
SET SMA LOGIN
L5 1 S E1

FILE 'INSPEC' ENTERED AT 13:24:34 ON 04 JUN 2003

L6 654 S L3
L7 5 S L4

FILE 'STNGUIDE' ENTERED AT 13:26:04 ON 04 JUN 2003

=>

L7 ANSWER 3 OF 5 INSPEC COPYRIGHT 2003 IEE
AN 1999:6424878 INSPEC DN A2000-02-4265-004
TI Photonic bandgap formation and tunability in certain self-organizing
systems.
AU John, S.; Busch, K. (Dept. of Phys., Toronto Univ., Ont., Canada)
SO Journal of Lightwave Technology (Nov. 1999) vol.17, no.11, p.1931-43. 70
refs.
Doc. No.: S0733-8724(99)08846-5
Published by: IEEE
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CODEN: JLTEDG ISSN: 0733-8724
SICI: 0733-8724(199911)17:11L:1931:PBFT;1-G
DT Journal
TC Theoretical
CY United States
LA English
AB We describe the microfabrication and band structure of large scale
three-dimensional (3D) photonic bandgap (PBG)
materials based on self-organizing templates. The simplest of these
templates is an fcc lattice of close-packed, weakly sintered spheres.
Other templates include hcp and hexagonal AB2 self-organizing
photonic crystals. These **photonic**
crystals may be converted into PEG materials by partially
infiltrating the template with high refractive index semiconductors such
as Si, Ge, or GaP and subsequently removing the template. The resulting
"inverse opal" structure exhibits both a photonic pseudogap and a complete
(3D) PBG in the near visible spectrum, spanning up to 15% of the
gap center frequency. The local density of states (LDOS) for photons
exhibits considerable variation from point to point in coordinate space
and reveals large spectral gaps even in the absence of a PEG in the total
density of states. These gaps in the LDOS may lead to novel effects in
quantum and nonlinear optics when active atoms or molecules are placed
within the PBG material. These effects include anomalous, low threshold
nonlinear response, collective atomic switching, and low-threshold
all-optical transistor action. When an optically birefringent nematic
liquid crystal is infiltrated into the **void** regions of the
"inverse" opal PBG material, the resulting composite material exhibits a
completely tunable PBG. In particular, the **3D** PBG can be
completely opened or closed by applying an electric field which rotates
the axis of the nematic molecules relative to the inverse opal backbone.
CC A4265 Nonlinear optics; A4250 Quantum optics; A7820P Photonic band gap
(condensed matter); A7820D Optical constants and parameters (condensed
matter); A7820J Electro-optical effects (condensed matter)
CT ELECTRO-OPTICAL EFFECTS; NONLINEAR OPTICS; PHOTONIC BAND GAP; REFRACTIVE
INDEX; SELF-ASSEMBLY
ST self-organizing systems; photonic bandgap; tunability; microfabrication;
FCC lattice; refractive index; inverse opal structure; photonic pseudogap;
near visible spectrum; local density of states; low threshold nonlinear
response; collective atomic switching; all-optical transistor; optically
birefringent nematic liquid crystal; applied electric field